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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BOWMAN, AMY HUDSON

ART UNIT PAPER NUMBER

1635

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

*Supplemental*  
**Office Action Summary**

Application No.

10/820,820

Applicant(s)

TAIRA ET AL.

Examiner

Amy H. Bowman

Art Unit

1635

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 8,9 and 12-18 is/are pending in the application.
- 4a) Of the above claim(s) 16-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8,9 and 12-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/9/2004.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. 08302005.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Status of Application/Amendment/Claims***

Applicant's response filed 6/2/2005 has been considered. Rejections and/or objections not reiterated from the previous office action mailed 3/2/2005 are hereby withdrawn. The following rejections and/or objections are either newly applied or are reiterated and are the only rejections and/or objections presently applied to the instant application.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

With entry of the amendment filed on 2/9/2005, claims 8, 9, and 12-18 are pending in the application.

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 8, 9 and 12-15, drawn to an RNA variant adopting the secondary structure (I), further comprising a ribozyme or antisense RNA, and to an expression vector comprising DNA encoding the RNA variant, classified in class 435, subclass 6.
- II. Claims 16-18, drawn to an RNA variant comprising specific structural characteristics, further comprising a ribozyme or antisense RNA attached to the 3' end by a linker sequence, and to an expression vector comprising DNA encoding the RNA variant, classified in class 435, subclass 6.

The inventions of groups I and II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different

modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the inventions of groups I and II have not been disclosed as capable of use together and have different effects. Each of the inventions are drawn to a different and distinct structure, each requiring a separate search and examination. It is the specific structure of each compound that leads to its function or effect. To search for one of the structures would not necessarily return art for another of the structures. Therefore, to search more than one of the instantly claimed structures presents a search burden.

Newly submitted claims 16-18 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 16-18 are drawn to an RNA variant comprising specifically from 5' to 3' a tRNA sequence in which the last seven bases of the mature tRNA sequence are removed. This invention is unrelated to the instant invention of group I, which is drawn to an RNA variant specifically adopting the secondary structure of SEQ ID NO: 4. The secondary structure of SEQ ID NO: 4 is not a limitation of the newly added claims.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 16-18 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***IDS***

The Sarver et al. reference was not originally considered because a copy of the reference was not supplied. It is noted that the reference of Sarver et al. has now been considered and an initialed IDS is enclosed.

***New Rejections***

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Cohen et al. (US 5,607,842).

The instant invention is drawn to an RNA variant adopting the secondary structure (I), wherein said RNA variant comprises a bulge structure introduced in the region in which hydrogen bonds form between nucleotides 8 to 14 and nucleotides 73 to 79. As explained in the 35 U.S.C. 112, 2<sup>nd</sup> paragraph rejection above, it is unclear what is meant by a bulge structure because the secondary structure (I) does not comprise such a bulge structure. Therefore, for purposes of search and examination, the claim is being interpreted as being drawn to an RNA variant adopting the secondary structure (I).

Cohen et al. teach an RNA variant adopting the same secondary structure as depicted in instant claim 8 as (I) (please see figure 4 of Cohen et al.).

Therefore, the instant invention is anticipated by Cohen et al.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8, 9, and 12-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The instant claims are drawn to an RNA variant adopting the secondary structure depicted as (I), wherein said RNA variant comprises a bulge structure introduced in the region in which hydrogen bonds form between nucleotides 8 to 14 and nucleotides 73 to 79. It is unclear what structure the instant claims are drawn to because the secondary structure (I) does not have a bulge structure introduced in the region in which hydrogen bonds form between nucleotides 8 to 14 and nucleotides 73 to 79. The structure (I) is depicted in instant claim 8, although the claim is drawn to a variant adopting such secondary structure. It is unclear whether the bulge is introduced into the secondary structure or into the variant adopting the secondary structure. It appears that applicant refers to both the structure depicted as (I) and a RNA variant that adopts such secondary structure as the RNA variant. Although applicant appears to be referring to the counting of nucleotides and introduction of a bulge into the secondary structure (I),

the instant claim is drawn to such nucleotides and insertion of a bulge into an RNA variant that adopts the secondary structure (I) rather than into the secondary structure itself.

Additionally, if a bulge was introduced into the instantly depicted secondary structure (I), it is unclear which nucleotides would be considered nucleotides 8 to 14 and nucleotides 73 to 79 because a nucleotide bulge would shift the numbering of the nucleotides. It is unclear whether nucleotides 8 to 14 and nucleotides 73 to 79 would take into consideration the introduction of a bulge.

Additionally, instant claim 9 is drawn to the RNA variant according to claim 8 comprising a bulge structure which is introduced by substituting all of the sequence in the region of nucleotides 73 to 79 within the nucleotide sequence of an RNA adopting secondary structure (I). If all of the nucleotides in the region of 73 to 79 are substituted, then there would not be a duplex region to form a bulge as recited in claim 8.

Although applicant has attempted to describe the metes and bounds of the duplex formed between nucleotides 8 to 14 and nucleotides 73 to 79 of a reference molecule, these positions in the claimed molecule are not adequately defined since the numerical nomenclature is only specific to the reference molecule instead of to the RNA variant which is instantly claimed.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 8, 9, and 12-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The invention of the above claims is drawn to an RNA variant adopting the secondary structure (I), wherein said RNA variant comprises a bulge structure introduced in the region in which hydrogen bonds form between nucleotides 8 to 14 and nucleotides 73 to 79. The invention is further drawn to the RNA variant of claim 8 comprising a bulge structure which is introduced by substituting all or part of the sequence of the region of nucleotides 73 to 79 within the nucleotide sequence of an RNA adopting secondary structure (I). The invention is further drawn to the RNA variant linked to a selected RNA chain, more specifically a ribozyme or antisense RNA, as well as to an expression vector comprising DNA encoding the RNA variant.

The instant claims encompass any RNA variant that adopts the secondary structure (I). It is unclear where nucleotides 8 to 14 or 73 to 79 would be located on such a molecule that is neither described or disclosed, having the secondary structure of SEQ ID NO: 4. Applicant is claiming a genus wherein it is impossible to determine secondary or tertiary structure from an undisclosed primary structure. As evidenced by Jen et al., RNA folding programs that generate folding patterns based on free energy calculations often give an unreliable depiction for in vivo relevance (see page 313). Applicant is claiming a large genus of RNA variants that would adopt a specific



secondary structure comprising bulge structures without providing a core sequence that a skill artisan would recognize as a sequence that would adopt the secondary structure of instant claim 8. Therefore, one of ordinary skill in the art would not be able to envision the genus of molecules instantly claimed and one would not recognize that applicant was in possession of the claimed genus at the time the invention was made.

Additionally, applicant has not described the bulge structure that is introduced. Applicant has not adequately described what types of structures are encompassed by a "bulge structure". As defined in the instant specification, page 4, a "bulge" refers a portion where there is a protruding single-stranded structure of unmatched base pairs. The bulge structure as instantly claimed encompasses anything from a single mismatch to introduction of a large loop structure. One of ordinary skill in the art would not recognize what types of structures could be introduced as a bulge without losing the instantly disclosed function of acting as a means of transportation for a ribozyme into the cytoplasm. Therefore, one of ordinary skill in the art would not be able to envision the genus of molecules instantly claimed and one would not recognize that applicant was in possession of the claimed genus at the time the invention was made.


### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amy H. Bowman whose telephone number is 571-272-0755.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on 571-272-0811. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.

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